WHAT IS CLAIMED IS:

1. A layered polycrystalline structure comprising:

a seed crystal layer containing a non-magnetic element at a first concentration level;

a magnetic crystal layer containing a non-magnetic element diffusing along a grain boundary; and

a non-magnetic crystal layer interposed between the seed crystal layer and the magnetic crystal layer, said non-magnetic crystal layer containing a non-magnetic element at a second concentration level smaller than the first concentration level.

2. A layered polycrystalline structure comprising:

a seed crystal layer containing Cr atoms at a first concentration level equal to or larger than 50at%;

a Co-based alloy magnetic crystal layer containing Cr atoms diffusing along a grain boundary; and

a Co-based alloy non-magnetic crystal layer interposed between the seed crystal layer and the Co-based alloy magnetic crystal layer, said Co-based alloy non-magnetic crystal layer containing Cr atoms at a second concentration level smaller than the first concentration level.

3. The layered polycrystalline structure according to claim 2, wherein said seed crystal layer is a pure Cr layer.

4. A magnetic recording medium comprising:

a substrate;

a seed crystal layer formed on a surface of the substrate and containing a non-magnetic element at a first concentration level;

a magnetic crystal layer containing a non-magnetic

element diffusing along a grain boundary; and

a non-magnetic crystal layer interposed between the seed crystal layer and the magnetic crystal layer, said non-magnetic crystal layer containing a non-magnetic element at a second concentration level smaller than the first concentration level.

5. The magnetic recording medium according to claim 4, wherein an amorphous layer is defined along the surface of the substrate.

6. The magnetic recording medium according to claim 4, wherein a Ti layer is defined along the surface of the substrate.

7. A method of making a layered polycrystalline structure, comprising:

forming a non-magnetic crystal layer on a seed crystal layer containing a non-magnetic element at a first concentration level, said non-magnetic crystal layer containing a non-magnetic element at a second concentration level smaller than the first concentration level;

forming a magnetic crystal layer on the non-magnetic crystal layer; and

subjecting at least the seed crystal layer, the non-magnetic crystal layer and the magnetic crystal layer to heat treatment so as to diffuse the non-magnetic element along a grain boundary within the magnetic crystal layer.

8. The method of making according to claim 7, wherein said second concentration level is set at a minimum level enough to establish a non-magnetic property of the non-magnetic crystal layer.

9. A method of making a layered polycrystalline structure, comprising:

forming a first magnetic crystal layer on a seed crystal layer containing a non-magnetic element;

subjecting at least the seed crystal layer and the first magnetic crystal layer to heat treatment so as to transform the first magnetic crystal layer into a non-magnetic crystal layer;

forming a second magnetic crystal layer on the non-magnetic crystal layer; and

subjecting at least the seed crystal layer, the non-magnetic crystal layer and the second magnetic crystal layer to heat treatment so as to diffuse a non-magnetic element along a grain boundary within the second magnetic crystal layer.

10. The method of making according to claim 9, wherein said non-magnetic crystal layer contains the non-magnetic element at a minimum concentration level enough to establish a non-magnetic property of the non-magnetic crystal layer.

11. A method of making a layered polycrystalline structure, comprising:

forming a magnetic crystal layer on a seed crystal layer containing a non-magnetic element;

subjecting at least the seed crystal layer and the magnetic crystal layer to heat treatment so as to form a non-magnetic crystal layer within the magnetic crystal layer along a boundary to the seed crystal layer based on a diffusion of a non-magnetic element;

subjecting at least the seed crystal layer, the non-magnetic crystal layer and the magnetic crystal layer to heat

treatment so as to diffuse a non-magnetic element along a grain boundary within the magnetic crystal layer.

12. The method of making according to claim 11, wherein said non-magnetic crystal layer contains the non-magnetic element at a minimum concentration level enough to establish a non-magnetic property of the non-magnetic crystal layer.

13. A layered polycrystalline structure comprising:

nucleation sites sparsely existing over a surface of a substrate; and

a crystal layer covering over the surface of the substrate and containing crystal grains growing from the nucleation sites.

14. A method of making a layered polycrystalline structure, comprising:

depositing a metallic material on a surface of a substrate;

subjecting the metallic material to heat treatment so as to form metallic islands sparsely existing over the surface of the substrate; and

cumulating metallic atoms on the surface of the substrate.

15. The method of making according to claim 14, wherein said metallic material is selected from a group consisting of Cr, Co, CoPt, CoW and a Co-based alloy.

16. The method of making according to claim 14, further comprising, previously exposing the surface of the substrate

to an adsorptive gas before the metallic material is deposited.

17. The method of making according to claim 16, wherein said adsorptive gas is an oxidative gas.

18. The method of making according to claim 17, wherein said adsorptive gas contains at least one of $O_2$, $O_3$ and $H_2O$.

19. The method of making according to claim 14, wherein said substrate is cooled down after the heat treatment.

20. The method of making according to claim 19, wherein said metallic material is selected from a group consisting of Cr, Co, CoPt, CoW and a Co-based alloy.